INSTRUCTIONS

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INCIDENT TO

PEACH, NECTARINE,

AND OTHER FRUIT TREES.

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INSTRUCTIONS

TO PREVENT THE

BLIGHT ON FRUIT TREES.

WHAT is uſually termed a blight on fruit trees, denotes any unkindneſs which appears and proves fatal to the bloſſom, and ſometimes the leaves. It may proceed from various cauſes. What, by theſe pages, it is my intention and ſolicitude to prevent, is occaſioned by a ſmall, green animalculæ, chiefly obſervable on peach and nectarine trees, early in ſpring, before the trees are fully in leaf. I am well ſatisfied, the eggs that produce them muſt be depoſited ſome time in the ſummer or autumn in the preceding year. The powerful influence of the ſun, which, in

the vernal months, promotes vegetation, brings them alſo into life at the very juncture when the trees are capable of affording them nouriſhment. It is wonderful to obſerve their injurious effects on the young ſhoots, where they principally abound. The ſap and nouriſhment the former would otherwiſe receive from the tree is ſo palpably intercepted, that they make little or no progreſs while theſe vermin remain. The leaves are not only prevented growing to their uſual ſize, but in general much coiled or curled up, and their ſhape conſiderably diſtorted. Theſe inſects may be found of different growths on the under and hollow part of the leaf; here they increaſe rapidly, and as any new leaf ariſes within their reach, they extend their empire, by invading it. But they only continue for a time, as the ſeaſon may chance to ſuit them. The calmeſt weather, as has been commonly noticed, ſeems moſt fa-

vourable to their continuance, but when it proves dry and warm, they much ſooner diſappear. This was the caſe laſt ſeaſon.

A tree is often partially affected only, and thoſe branches leaſt affected by them will proſper and make good kind wood, while ſuch as are moſt infeſted remain in a very ſtinted, dwarfiſh ſtate. The ſame ſhoots, however, as ſoon as they have got rid of the enemy, grow for the moſt part vigorouſly beyond the wound made by the blight; but the wood, made during the time the inſects are upon it, remains juſt as before, the joints being ſcarce a tenth of their proper length: yet this is the part of the ſhoot moſt depended upon to bear the ſucceeding year. From this fact it muſt appear how very eſſential it muſt be, that trees make proper wood in the early part of the ſeaſon, that it may duly ripen, and be put in proper condition for producing fruit.

I have the authority of Millar to ſay, "thoſe ſhoots which are produced after the beginning of June will be crude and pithy; and though they ſometimes produce bloſſoms, yet they will rarely bring fruit: nor are the future branches good which are produced from ſuch wood, the veſſels being too large to ſtrain the juices. So that they each admit great quantities of crude nouriſhment to paſs through them."

The opinion of a man ſo eminent in his profeſſion, I hope, will have due weight, and ſatisfy my readers of the neceſſity there is to obtain wood in proper ſeaſon, or the early part of ſummer. This, however, cannot certainly be done, if the trees are ſeverely blighted at the very time they ſhould be acquiring a quality ſo indiſpenſible to their bearing.

How common is it for an owner to fancy himſelf diſappointed, from the appearance of his trees in the time of

bloom. They make a tolerable ſhew of bloſſoms; he is, in conſequence, anticipating a plentiful crop of fruit; the weather favourable; no pinching froſts to take them off; and, perhaps, his trees carefully matted every night, to preſerve them. Notwithſtanding all theſe promiſing appearances, he perceives his bloſſoms die untimely away, without ſetting fruit agreeably to his moſt ſanguine expectations.

I doubt not but many will acknowledge this to be the caſe. I have been much at a loſs how to account for the failure, or in what cauſe it originated, little ſuſpecting it to be the conſequence of laſt year's blight; perhaps the more ſo, as the trees had put forth vigorouſly, though late in the ſeaſon, or out of due courſe; which ſhoots, by the bye, actually require a whole ſummer's ſun to maturate them. Admitting, however, a quantity of fruit may be ſet, is it reaſonable to expect it can arrive to any

degree of perfection, while the trees are ſo much blighted as to have prevented their making proper wood?

My own trees were, in my opinion, a ſtrong confirmation of this fact. Three-fourths of what little fruit I had, which fortunately eſcaped a few nights ſevere froſt, were found upon thoſe parts where the dreſſing was applied; and theſe were much ſuperior to ſuch as grew on the other parts which had been blighted. This circumſtance could ariſe only from a greater degree of health and vigour prevailing in the parts dreſſed, than ſuch parts as were not.

It is a very common remark, in ſpring, when apple bloſſoms, more eſpecially, are much infeſted with caterpillars, to ſay they are badly blighted, and many entertain the notion that theſe blights are brought by cold eaſterly winds; but, in my opinion, theſe winds are more likely to deſtroy than to bring them.

I ſhall now ſtate what they actually proceed from, without retaining the leaſt doubt in my own mind. Indeed, I think I have full proof that it muſt be, and really is, from eggs laid the preceding year; and that theſe eggs continue in a dormant ſtate until the ſeaſon becomes ſufficiently warm to hatch them, and alſo to produce proper food, congenial to their kinds. We ſee a particular inſtance in Nature, pointing out to the parent to depoſit their eggs on ſuch trees and plants only as are moſt ſuitable for their ſubſequent exiſtence. To ſatisfy my readers that this is no miſtake, ſoon after the trees had caſt their leaves, I took a branch from one of my apple trees, with a number of bloſſom buds, and examined it with a microſcope. Round every bloſſom bud I could clearly diſcern a quantity of eggs, and not one on any other part of the branch. They were all cloſe by the foot, or baſis, of the bud,

which made me conclude that the bud had conſiderably grown ſince the eggs were laid, or they would otherwiſe have been depoſited nearer the end or centre of the bloſſom. Theſe caterpillars appear only in the ſpring, when they ſoon change into the ſtate of moths, which lay their eggs, and, having performed the office aſſigned them by Nature, ſoon die. It ſtruck me, as a curious fact, that none of the eggs could be perceived about any of the leaf buds, but only near the preciſe ſpot where the young caterpillar was to find its food. So extremely ſmall muſt theſe animalculæ be, when they firſt obtain life and motion, that, had they but a ſingle inch to travel, they might be loſt for want in ſo long a journey.

I do wiſh thoſe who peruſe this would take the trouble of repeating the experiment, and themſelves make the minuteſt inveſtigation of what is here ſtated; when I am ſure they

will be convinced, from their own obſervation, I have not impoſed upon them.

In a book that I have lately ſeen, publiſhed, I believe, by the Bath Society, there is a letter on this particular ſubject, where the writer recommends ſmoking the trees for killing the caterpillar; but which, in my apprehenſion, will little avail. For I conceive that they ſoon enter into the heart of the bud after being hatched, where they find a retreat ſo perfectly ſecure, as to prevent their annoyance from any ſmoke. This writer relates a remarkable difference, one ſeaſon, between his own trees and the trees of another perſon at ſome diſtance. His were nearly deſtroyed by the caterpillar, while his neighbour's appeared free and very promiſing. Wiſhing to comprehend a phenomenon ſo ſingular, he applied himſelf very cloſely to inveſtigate the fact. He found that, adjoining the garden where the

trees were ſo proſperous, there was a malt-houſe, with ſome other erections, which he ſuſpected were the means of keeping off or deſtroying the caterpillar. It rather ſtrikes me theſe works prevented the moth from laying her eggs where ſhe muſt have been ſo much annoyed by ſulphurous effluvia from the fires, and that ſhe had ſelected a ſituation where the air was more pure. And from the obſervations of this ſort, which occurred to me occaſionally, I am apt to think the gardens in towns are leſs infeſted with theſe kinds of caterpillars than thoſe in the country. In ſome ſeaſons I have remarked large crops of apples in confined ſituations, when perhaps entire orchards, much more expoſed, ſcarcely produced one, and which I attribute to the cauſe juſt ſpecified.

From what has been premiſed, let me flatter myſelf my friends will agree with me in thinking *prevention*

preferable to a cure; and that the moſt rational plan is to deſtroy the eggs, and by that means prevent their vivifying. This can never be done ſo effectually as when trees are in a ſtate of reſt, diveſted of their foliage. And this operation can then eaſily take place, without the leaſt injury to the trees. The ſame which I have found anſwer completely on peach and nectarine trees, there is not a doubt in my mind, will alſo prove equally efficacious on all other fruit trees, ſubject to ſimilar injury in the ſpring. This expedient may probably be deemed very ſimple; but, if ſufficiently efficacious, that, I think, ſhould recommend it. What I commonly uſed for this purpoſe, is known to poſſeſs a cauſtic, burning quality, but which is in no degree hurtful to vegetation. Other ſpecifics may have equal energy, but I much queſtion if the whole materia medica will fur-

niſh any thing capable of anſwering the end more completely.

WINTER DRESSING.

Take quick lime, of the ſtrongeſt kind that can be obtained, ſlack it by dipping the lumps in hot water, and as ſoon as it drops into powder, mix it up with chamber-ley, to the conſiſtence of white-waſh. But, as the trees would make a ſingular and not very agreeable appearance to be dreſſed all in white, I would have added as much yellow ochre and brown umber, with a little lamp-black, as will bring it nearly to the colour of the bark of the tree. The dreſſing, by theſe means, will be hardly perceptible at a little diſtance. Allowance ſhould likewiſe be made, in mingling it, for drying lighter. Uſe it quite freſh while it remains quick, that the cauſtic quality of the lime may not be loſt. I would not adviſe uſing it either in ſevere froſt, or when

the weather is wet. No ſize muſt be uſed with it. This, though found neceſſary in white-waſhing or colouring, in diſtempers within doors, it would have a contrary effect expoſed to the rain and moiſture of the atmoſphere. This would cauſe it to diſſolve and waſh off. The dreſſing I have found in general to adhere ſufficiently without it. My trees yet retain more or leſs of the dreſſing, though dreſſed nearly eleven months. I believe the lixivium made by ſoap-boilers might be found very good, but the other ſufficiently anſwers the purpoſe without it.

For wall trees uſe a ſmall painting bruſh. Omit no part of the tree, but pay very particular attention to the laſt year's wood. Take ſpecial care to cover the buds well, the eggs of the inſect being always lodged as cloſe by them as poſſible.

Standards require a bruſh of greater ſize, with longer briſtles, and cloſer

ſet. A handle pretty long will alſo be found more convenient and efficacious. Begin here at the bottom, and work upwards, to avoid annoyance from the dreſſing.

The buſineſs ought not to be done long before the buds begin to puſh, leſt haſty rains ſhould waſh and render it ineffectual. It is certainly more ſafe for it to remain on the trees, in caſe any eggs ſhould not be deſtroyed, though I foreſee little danger. But, ſhould it ſo happen, they will be ſo faſt incloſed in the dreſſing, that it is very improbable, in their infantile ſtate, they will be able to extricate themſelves. This compoſition has alſo a tendency to deſtroy moſs on trees; that agreeable effect it appears at leaſt to have produced in my garden.

Vines, peach, nectarines, pears, and apple trees, are all very ſubject to be infeſted with what I term a tree bug, from ſome reſemblance theſe

vermin have to that well-known inſect. They adhere tenaciouſly to the bark, and before they begin to breed, appear quite motionleſs, and, as far as I could perceive, without any legs. Indeed it ſeems difficult to diſtinguiſh head from tail. As the warm weather comes on, a white ſubſtance may be obſerved, which increaſes ſo much in ſize, that where trees are greatly infeſted, it may even be ſeen at a conſiderable diſtance. By remaining for any length of time, an innumerable ſwarm of young will be found, and a few breeders ſoon overrun a large tree. Independent of the injury they do by deſtroying the health of the bearers, they give the trees a moſt diſagreeable, diſeaſed, and filthy aſpect.

A pear tree of mine was much overrun with theſe bugs, and all attempts to keep them under proved fruitleſs, until I had it dreſſed with this compoſition, which entirely de-

ſtroyed them. Not a ſingle veſtige of them has been ſeen ſince. The tree has now the appearance of being remarkably clean and healthy, and bore a better crop of fruit laſt year than ever it had done before, though it had repeatedly blown.

About ſeven years ago, I had a quantity of apple trees from a nurſery near London. After they were planted, I obſerved in the crevices of one of them a white ſubſtance. On rubbing it, my fingers ſeemed bloody, and I found great numbers of animalculæ, but could never diſcover the parent of the breed. I waſhed the parts with a ſtrong decoction of tobacco, but, from time to time, found them rather increaſe than diminiſh, and I began to apprehend they might ſpread over the whole garden. By having recourſe, however, to a mixture ſomewhat ſimilar to that I have recommended as a preventive

againſt blights, I at length ſubdued them.

Many reaſons incline me to ſuſpect that they are very prevalent in the gardens about town. I was in one there laſt ſummer, when the owner of it complained of the great injury he had ſuſtained by their depredations among his vines in the houſe, and alſo on his apple trees, where I had ocular demonſtration that they much abounded. But the free uſe of this dreſſing, I am fully perſuaded, will utterly extirpate them.

The cloſe attention I have paid to this matter, and the minute inſpection I have unremittingly taken of the various appearances of fruit trees, convince me the tribes of hoſtile inſects, which moleſt them, are far more numerous than is generally imagined. Many of them are imperceptible to the naked eye, and not diſcernible but through a good microſcope. I am alſo very ſure the moſs on trees

is quite an aſylum for them. Here they harbour and breed unmoleſted. By ſcraping off the moſs, ſmall fragments may be ſeen, ſuſpended by threads, too fine to be viſible to the niceſt eye, which doubtleſs muſt be the work of inſects. But the dreſſing, as already ſtated, bids fair to eradicate the moſs, and with it, aſſuredly, whole tribes of theſe deſtructive animalculæ, leaving the bark both ſleek and kind.

To deſtroy the inſects and the moſs, I have likewiſe tried the concentrated oil of vitriol, diluted with three or four parts of water, which evidently killed both, and may be innocently enough applied while the trees are at reſt. Nor would it, at that ſeaſon, in the leaſt degree injure the tendereſt bloſſom-buds. I once did imagine it might prove an excellent waſh to prevent the ſmut in wheat, and for two or three years intended to have tried the experiment; with this view I

employed a perſon to procure me ſome, which he neglected, and I never brought it to proof. I am lately informed, however, that the experiment has been tried by another, and, according to his account, with the greateſt ſucceſs; of which I have not a doubt, ſo firmly am I perſuaded it would have that effect. His wheat, I think he ſays, was ſoaked in it for about twenty hours, which aſtoniſhed me not a little, as I ſhould have ſuppoſed in much leſs time it would ſo far have penetrated the grain, as utterly to have deſtroyed its vegetative quality. But this ſhews the free uſe that may be made even of ſuch a corroſive acid. Though I have not brought it to trial in my own practice, I make no doubt but that it would anſwer perfectly well to dreſs trees with, for freeing them from the eggs of the caterpillar.

It were unneceſſary to caution any againſt mixing it with the compoſition I have recommended, as the one

would inevitably neutralize the other, by which the effect of both would be loſt. Where the vitriol is uſed, great care is neceſſary that none of the ſparklings fall on any part of the clothes, as it will not fail to ſhew where it has fallen by the damage it occaſions, as I have myſelf too often experienced, by uſing it to other purpoſes.

I have now given all the information neceſſary on this part of the ſubject, and which, if duly attended to, will, I flatter myſelf, be found perfectly ſatisfactory. But fruit has many other enemies beſides thoſe animalculæ, tree-bugs, or caterpillars, and I hope it will be an acceptable addition to what has been ſaid, to inform my ſubſcribers of the means I have alſo deviſed for ridding our fruit of them. Theſe will be found for the moſt part new, as alſo the beſt and moſt effectual hitherto adopted.

Give me leave only to premiſe, by ſuppoſing a gentleman to have a fine

wall of trees, plentifully hung with peach, nectarine, apricots, cherries, plums, grapes, and pears. He naturally contemplates how amply and luxuriouſly his table will be ſupplied with delicious fruits: the ſeaſon more warm and kindly for maturing them than uſual, his hopes may be defeated, notwithſtanding, as commonly enough happens, by an abundant year of waſps, which, not content with the refuſe of the fruit, chuſe for themſelves. And it is as natural for them, as for us, to ſelect the beſt and ripeſt; and very buſy they always are, and induſtrious, not only on their own account, but to feed and cheriſh their young. It is wonderful what quantities they devour and carry away: on finding a tree to their liking; they rarely or never quit it while any fruit remains. There is no little danger in attempting to pick the fruit, or to diſpoſſeſs them of their capture. Their defence is fierce and obſtinate;

they even ſeem to have the means of informing their aſſociates belonging to the ſame neſt, where ſtores of food are collecting. This fact may be confirmed by a very curious circumſtance.

I have been trying for ſeveral years to diſcover what will moſt effectually deſtroy them, and preſerve the fruit. Apprehending nothing would attract them equal to honey, the ſummer before laſt I mixed up a quantity with arſenic, finely powdered: this I placed in walnut-ſhells of the largeſt kind, boring a hole through both ends of each, by which I fixed a ſtring, and ſuſpended them againſt the wall among the vines. It happily preſerved my fruit, as both waſps and flies evidently preferred the honey. I was apprehenſive, however, it did not deſtroy them; the arſenic, from its weight, might ſubſide to the bottom, and though they fed freely on the ſweets, they omitted the poiſon.

Hearing of a ſoluble arſenic, prepared by *Allen and Howard, Plough-Court, Lombard-Street, London*, called arſeniat of potaſh, I obtained a ſmall quantity. I mention where it was procured, as I believe it is to be had in but few places in the country. This I diſſolved in the proportion of one of arſeniat to eight of water, and mixed it with about an equal weight of honey. I then thought of ſomething that would do better than the walnut-ſhells, which were the tubes, which grow ſpontaneous in moſt hedges; or the moſt common kind of cane uſed for fiſhing rods. Theſe I cut ſo as to leave a joint at each end, and took out about a third or fourth part of the circumference, from joint to joint, to make a proper opening. Theſe I fixed to the wall in a horizontal direction. If placed between two ſprays, they will be ſufficiently ſteady, preſerving as much of the round above as below; which, in a great meaſure, prevents

the rain falling in, and the aperture will be in front. Into each I put about a tea-ſpoonful of the mixture, taking care that it ſhould run the whole length of the tube, which will eaſily accommodate a conſiderable number of waſps and flies. As often as the mixture is devoured, be ſure to have it renewed, which will be generally neceſſary about once a day. The arſeniat may be diſſolved with the water in any quantity; but, from what I obſerved, it will not do well mixed with the honey long beforehand. I firſt applied it to a tree of the Stanwel apricot, which had a fine crop, and was moſt attacked by the flies, but at that time there was not a waſp to be ſeen. I obſerved the flies forſook the fruit to feed upon the honey, and confining ſome which had partaken of it, I found it deſtroyed them in the ſpace of two or three hours.

Though there were great plenty of waſps in the ſpring, I concluded,

or hoped at leaſt, the ſtorms and floods in ſummer muſt have drowned, as ſometimes happens, their neſts; and their uncommon ſcarcity then led me to fear I ſhould not have a proper opportunity of proving this mixture ſufficiently on them; but about the time my ſweet water grapes were ripening, many of them reappeared. The wet weather had cauſed ſome of my grapes to burſt, which, no doubt, diffuſed the ſcent of them, and made them the more attractive to the waſps; but, on my placing the tubes there, I had the ſatisfaction to obſerve they did not in one inſtance ſettle upon the fruit, but fled from one depoſit of the mixture, to another, until they had ſufficient, when they took themſelves clear away, probably, to carry food to their young; and in three or four days they left us entirely. I readily concluded they were all dead, young as well as old, but one happening to

fly into my houſe, the ſaſh was inſtantly thrown up, to confine him, and ſome of the mixture brought, of which he ate heartily. He would then have made his eſcape, but was prevented, and in about three hours it died.

The quantity of flies deſtroyed by the ſame means muſt have been very great: they ate near a pound of honey, beſides the addition; but having no ſettled home, and not feeding their young like the waſps, the poiſon could prove deſtructive only to thoſe which fed on it: but by uſing the mixture freely, and beginning the uſe of it early, they may probably be conſiderably thinned.

There is good reaſon to conclude, were this plan duly followed up and regularly practiſed, we ſhould at no time have ſuch ſwarms of waſps as there are, particularly in ſome ſeaſons. This is extremely deſirable in many reſpects. Independent of the

havock they make among the fruit, their preſence in the garden is highly offenſive. Their utter extinction would happily remove the fear of being ſtung by them. They are, in general, very noxious, and much dreaded, eſpecially by ſome of our females, for their fierce, vindictive qualities; and ſurely it is an object of ſome importance to appeaſe their apprehenſions in their agreeable retreats, and free their innocent recreations among the luxuries of cultivated nature, from the intruſion of ſuch troubleſome and dangerous gueſts. We know, in a plentiful year of theſe vermin, how virulent, teaſing, and provoking they every where become. No place, where there is the leaſt crevice for their admiſſion, is inacceſſible to them. Not the moſt private receſſes, are altogether, or long, free from their viſits. They are no reſpecters of perſons. All, of every claſs, and the

youngeſt and tendereſt, as leaſt on their guard, are liable to be annoyed by them.

All theſe inconveniences might readily and effectually be prevented, by fixing ſome of the tubes, as I have deſcribed them, on the outſide of the houſe. While they fared ſo deliciouſly there, they would have no inducement to come in; nor would they be likely to pay more than one viſit. They will feed upon it with that avidity, that a ſingle doſe will undoubtedly prevent their return.

Some may be apprehenſive this expedient may have a tendency to draw domeſtic bees, and of which, ſhould they carry ought to their hives, the conſequences might be ſerious. It would not only deſtroy theſe uſeful, induſtrious inſects, but materially injure the ſalubrious quality of the honey, and thereby be productive of ſome miſchief.

This idea, indeed, at firſt occurred to me; but I ſoon found there was no danger, as, in all my viſits, to make obſervations, I ſaw not, at any time, one domeſtic bee about the mixture. But even admitting they were, the quantity of deleterious quality in the mixture would be ſo diſproportionate to the general maſs, that no reaſonable apprehenſions could be entertained on this head.

There could be little danger, were it even uſed at the time the trees are in bloom; they are ſo ſtrongly attracted by the fragrance of the flowers, they would ſcarcely regard that circumſtance. This I mean to bring to the teſt, whenever the ſeaſon comes round. It is a circumſtance greatly to be wiſhed, that the waſps fed on this mixture in the ſpring. It is a received opinion, and I believe a fact, that each individual neſt is begun by a ſingle waſp, conſequently, every one poiſoned then

would prevent a whole neſt or ſwarm; but from my particular obſervation, at that critical ſeaſon, they appear more aſſiduous in acquiring materials to build with, than in ſearch after food.

There are other inſects likewiſe deſtructive of fruit. Earwigs are well known to make ſad havock, particularly among the peach and nectarines. For many years I have been in the practice of catching great numbers, by fixing an adequate number of tubes among the trees. Theſe were cut ſo as to have a joint at one end, and a ſmall hole through it. Theſe ſhould be placed in proper time, before the inſects have increaſed much by breeding, as it will prevent them from becoming numerous. The tubes ſhould alſo be examined twice in a week. My method is to take a jug of hot water, and blow through the tubes into the jug, which kills them in an inſtant. It is

difficult to diſpatch them by treading on them, as many are then ſo apt to make their eſcape.

I had a part in a garden, ſome years ago, where there was a good wall of trees, and one ſeaſon in particular an abundance of earwigs. By purſuing this method we, at one time, killed near a pint meaſure of them, and by our attention in the uſe of ſuch means as we knew, preſerved a very fine crop of fruit, which muſt have been much injured by them, if not wholly loſt, but for this expedient.

I have tried the mixture made up for the waſps, but could not perceive they would feed upon it.

Ants are alſo deſtructive to fruit. I had a conſiderable run of them for ſeveral years, at one end of my houſe, and had tried various expedients for their extinction, but all to little or no effect, until I was informed they could not run over a chalk

line. It then occurred to me, ſome method might be deviſed of that kind to entrap them; as their movements were in a horizontal direction. I immediately drew a perpendicular line, and ſoon found it impede their progreſs, and that multitudes collected on each ſide of the line, thronging one another to paſs on. The conſequence was, that many inceſſantly fell down, and, by placing two or three ſmall earthen pans, with upright ſides, cloſe to the wall, their ſurface even with the ground, and about half full of water, they fell in. But to prevent their eſcape by running up the ſides of the pans, I put in a quantity, perhaps one-fourth, of the oil of vitriol, which ſuddenly deprived them of motion. By this means immenſe quantities were caught; perhaps twenty thouſand in the ſpace of three weeks. They dropped in ſo faſt, that it became neceſſary to ſcum them off once or

twice a day, as the liquid might have otherwiſe been rendered ineffectual to the crowds which followed. The chalk line alſo required to be renewed, as the conſtant efforts made to paſs it muſt have worn away the chalk.

If earthen pans, with flat ſides, could be obtained, they would anſwer better. In their uſual round figure, but a ſmall part can come in contact with the wall, and many of the ants fall on one ſide. The edges of the pan ſhould alſo be thin, to fit the cloſer to the wall. Might they not be made of glaſs? I intend to prove ſome of this conſtruction the enſuing ſeaſon. They need not be large. About four inches over, and three deep, will be a proper ſize.

I afterwards found it needful to make chalk lines in different places; for the ants, perceiving their way blocked up, endeavoured to find out another. In all ſuch caſes, a little at-

tention will readily ſuggeſt what is beſt to be done.

I alſo tried the ants with the mixture, but did not find them eat much of it. But great numbers may be killed by laying fleſh for them. A dead rat, mouſe, frog, or toad, would anſwer very well, laid in walks, and covered with a flower pot, to prevent any thing elſe carrying it away. Examine it often, and, when covered with ants, dip it in hot water. It may then be laid down again, and may ſerve ſeveral days; but had better be removed at night, becauſe, where the ants are very numerous, it might be nearly deſtroyed by morning.

Thus, having now mentioned and pointed out the means of deſtroying moſt of the enemies to fruit, one more of this hoſtile tribe now claims our attention. The reader may probably anticipate me, as meaning that little arch, but miſchievous bird, the *tom-*

tit. I may poſſibly be more frequently viſited by this kind of aſſailants than moſt of my neighbours, my garden being ſituated in the vicinity of ſome lofty trees, where they may probably breed. Few ſorts of fruit come amiſs to them, but they are moſt partial to cherries and pears. I have an autumn burgamot tree, which bore plentifully laſt ſeaſon: but theſe little buſy birds ſcarce allowed one to come to perfection. And in a garden, a ſmall diſtance from mine, which contains a great variety of winter pears, they made ruinous work indeed, by picking a ſmall hole near the foot ſtalk, which cauſed them to decay. It did not occur to me in time, otherwiſe, perhaps, they might have been deſtroyed before all this miſchief had been done. They are mighty fond of the ſeeds of poppy. Many of theſe grow on and near my premiſes; as the heads of which get ripe, they are moſtly deſtroyed for

ſake of the ſeed. The method I intend to obſerve next ſeaſon, is, as the heads ripen, to make a ſmall opening at the top, and pour into each ſome of the ſolution of arſeniat, which muſt ſo effectually poiſon this favourite food of theirs, as they cannot well ſurvive. I tried the experiment with three or four that had eſcaped them, which were pecked in the ſame manner as the others; and I think there is good reaſon to conclude it muſt have proved fatal to ſuch as had fed on the ſeed.

They may alſo be caught by common mouſe-traps, in winter, baited by a bit of fat. And, ſurely, every means of deſtroying them ſhould be adopted, as they do every where ſuch incalculable injury. An idea is entertained, indeed, by many, that theſe birds are very ſerviceable, at this ſeaſon of the year, in devouring ſuch inſects as they find on the trees. Poſſibly they may; but it ſtrikes me

that their uſe, in this reſpect, may be overrated. The eggs of caterpillars, formerly deſcribed, are much too minute to afford them any food, and far too numerous to allow of any benefit reſulting from their labours in picking them up. Were the method ſtated and recommended in the preceding part of this performance duly practiſed, we might very well diſpenſe with their aſſiſtance, in preventing ſuch blights as are occaſioned by caterpillars. The certain miſchief they do more than overbalances all the good they can effect. Could they be diverted from the one, who would not readily excuſe them the other?

Various expedients have been deviſed and adopted for ridding our gardens of *mice*. They very often ruin the early crop of peaſe. I have been in the practice of mixing oatmeal with arſenic, finely powdered, put in a ſmall oyſter ſhell, placed be-

tween two bricks, covered with another, or a tile, to keep it dry. A different plan occurred to me this ſeaſon. Having ſoaked a quantity of wheat in the ſolution of the arſeniat of potaſh, in the proportion of an eighth part of an ounce to about ſix ounces of water, I let the wheat remain in the ſolution full twenty-four hours. Some of this, which was laid for them, was taken away the firſt or ſecond night, and a freſh quantity put in its room: but none of this ſeems to have been meddled with, as the firſt had, no doubt, deſtroyed them. One parcel was within doors, where they had made free to carry off ſome ſeed put down to dry. This would probably prove the beſt means of deſtroying both rats and mice, in barns and out-houſes, taking care to ſecure it from poultry. Of dogs or cats meddling with it, there could be no danger.

I hope, my friends, the ſubſcribers,

will, by this time, acquit me of withholding ſuch information as appears to me uſeful and neceſſary, and which, for the moſt part, will, I believe, be found entirely new, as well as far exceeding what they were given to expect from the printed advertiſement. They will permit me to add my honeſt perſuaſion, that the directions, here ſtated, duly obſerved and practiſed, by thoſe concerned in gardening, will have the beſt effect; and, by preſerving much private property, do a great deal of public good.

What now remains, is to ſuggeſt ſome hints, chiefly reſpecting the management of peach and nectarines. Here the reader muſt expect but little new matter, as my principal intention is to revive old precepts. Theſe, from long obſervation, I am too well perſuaded, are by no means treated with the conſideration they deſerve. The trees under notice, by this neglect, are certainly, by very

many, badly managed. There are, in gardening, as in phyſic, too many pretenders; and the care of theſe trees, like the health of more unfortunate invalids, are often enough committed to the care of thoſe of little or no judgment. They may know how to dig and crop the ground, and yet remain perfectly ignorant of the proper pruning and nurſing theſe delicate trees. Such ſkill and attention as this buſineſs requires, are not to be acquired but by long experience and much correct obſervation. Peach and nectarine, in particular, bear only on laſt year's wood. It is neceſſary, therefore, to forecaſt and provide, by all poſſible means, a regular ſupply of freſh wood, in every part, and ſuch as will be moſt likely to prove fruitful. The young ſhoots muſt not be left too long at the autumn or winter pruning. This advice will be more effectually offered, in the words of Millar, whoſe authority will, I pre-

ſume, have its proper weight. He has given as ample and plain inſtruction on the ſubject as can be expected or even deſired. He ſays, "In the beginning of October, when the trees have done ſhooting, you ſhould prune them; in the doing of which, you muſt ſhorten the branches, in proportion to the ſtrength of the tree, which, if ſtrong, may be left eight inches long; but, if weak, ſhould be ſhortened to four or five: train them horizontally to the wall, ſo that the middle of the trees may be void of branches;" (he is now, it is to be obſerved, giving directions reſpecting the management of young trees;) "for that part of the wall will be eaſily furniſhed with wood afterwards; whereas, if the ſhoots are trained perpendicularly to the wall, thoſe which are the ſtrongeſt will draw the greateſt ſhare of the ſap from the roots, and mount upwards, ſo that the ſide branches will be deprived of their

nouriſhment, and grow weaker, until they many times decay; and this is the reaſon we ſee ſo many peach trees with one upright ſtem in the middle, and the two ſides wholly unfurniſhed with branches; whereby the middle of each tree cannot produce any fruit, that being filled with large wood, which never produces any bearing ſhoots. Nor can the two ſides of the trees be regularly filled with fruitful branches when this defect happens to them; therefore this method ſhould be carefully obſerved in training up young trees; for, when they are permitted to run into diſorder at firſt, it will be impoſſible to reduce them into a regular, healthful ſtate afterwards, the wood of theſe trees being too ſoft and pithy to admit of being cut down again, as may be practiſed on many other hardy fruit trees, which will ſhoot out again; whereas theſe will gum at the places

where they are wounded, and, in a few years, entirely decay."

I here beg leave to remark, that many trees, which I have obſerved, through miſmanagement, are rendered deſtitute and incapable of bearing wood, except upon the upper part of the wall. The lower branches, being nothing but naked ſtems, may be made young trees again, by cutting them down within a foot or eighteen inches of the bottom, taking off the part as ſmooth as poſſible, and in a ſloping direction, to prevent the wet lodging. Then bruſh it over with a little boiled linſeed oil, which, in a few days, will form a varniſh, preſerve the wood from decay, and prevent it from gumming. This I would recommend to be applied to all fruit trees, where there may be occaſion to take off large branches. The boiled linſeed oil I have uſed, with ſucceſs, to my vines, having found, when old wood has

been cut out, although in autumn, they have been ſubject to bleed in the ſpring. Applying the oil, however, entirely prevented it. Where there may be ſeveral naked arms in a peach tree, I would adviſe to cut down but one at a time, leaving the others to bear, while the one ſhortened was making young wood to fill up the wall. I alſo make uſe of it to any trees which are cankered, obſerving firſt to pare it clean out, ſo as to have live bark all round, which I think of conſiderable ſervice to its healing and diſpoſing the bark the better to grow over again. Such cankered parts are often, I believe, if not generally, the receptacle for inſects, and, I conclude, much increaſed by them; and, if ſuffered to remain, will greatly ſpread. I have compared it to a mortification in the human body. Apple trees, in particular, are very ſubject to this diſeaſe, but much more ſo in ſome ſoils than

in others. But to proceed, after this, I hope not unneceſſary, digreſſion.

" The ſummer following, when the trees begin to ſhoot, you ſhould carefully look over them, to rub off all foreright buds, or ſuch as are ill placed, and train thoſe that are deſigned to remain horizontally to the wall, in due order, as they are produced; for this is the principal ſeaſon, when you can beſt order them as you would have them; whereas, if they are neglected until midſummer, as is the too common practice, a great part of the nouriſhment will be exhauſted by foreright ſhoots and other uſeleſs branches, which muſt be afterwards cut off; and hereby the remaining ſhoots will be rendered very weak, and perhaps ſome part of the wall be entirely unfurniſhed with branches, which might have been eaſily ſupplied, in the beginning of May, by ſtopping ſome of the ſtronger ſhoots in ſuch parts of the tree where

there is neceſſity of more branches, which would cauſe each of them to ſhoot out two or more ſide branches, below the ends of the ſhoots, which may be guided into the vacant parts of the tree as they are produced, ſo that every part may be regularly furniſhed, which is the greateſt beauty and excellency of wall trees: but you ſhould always forbear ſtopping the ſhoots in ſummer, where there is not a neceſſity for branches to fill the wall; for there cannot be a greater fault committed than that of multiplying the number of ſhoots, ſo as to cauſe a confuſion, whereby the branches will be too weak to produce good fruit; beſides, when they are laid in too cloſe upon the wall, the air is excluded from the ſhoots by the great number of leaves, ſo that they are never duly ripened; and, conſequently, what fruit is produced thereon, cannot be ſo well taſted as thoſe which are produced upon ſuch

trees where the ſhoots receive all the advantages of ſun and air to maturate them. Thus, having ſet down the method of training up young trees, I ſhall now proceed to their pruning and future management, which, being the ſame as with full grown trees, will ſerve for general directions how to manage theſe ſorts of fruit.

"In the pruning of peach and nectarine trees, (which require the ſame culture), the two following rules ſhould be ſtrictly obſerved: viz. Firſt, that every part of the tree be equally furniſhed with bearing wood; and, ſecondly, that the branches are not laid in too cloſe to each other, for the reaſons before laid down, with ſome others, which will be hereafter inſerted; as to the firſt, it muſt be obſerved that all theſe trees produce their fruit upon the young wood, either of the preceding year, or, at moſt, upon the two years ſhoots; after

which they do not bear; therefore the branches ſhould be pruned ſo as to cauſe them to produce new ſhoots annually, in every part of the tree, which cannot be done in the ordinary method of pruning, where perſons neglect their trees at the ſeaſon when they are moſt capable of management, which is in May; at which time the luxuriant growth of branches may be checked by pinching, and new ſhoots produced where they are wanting, by ſtopping the neighbouring branches; which ſhoots, being produced at that ſeaſon, will have time enough to ripen and gain ſtrength before the autumn comes on; whereas (note) all thoſe ſhoots, which are produced after the beginning of June, will be crude and pithy; and though they may ſometimes produce a few bloſſoms, yet they will rarely bring fruit; nor are the future branches good which are produced from ſuch wood, the veſſels being too large to

ſtrain the juices, ſo that they eaſily admit great quantities of crude nouriſhment to paſs through them; therefore, thoſe perſons who only regard their wall-trees at two different ſeaſons, viz. the winter and midſummer pruning, cannot poſſibly have them in good order, for when all the branches, which were produced in the ſpring, are permitted to remain till the middle or latter end of June, (as is the common practice) ſome of the moſt vigorous will draw the greateſt part of the nouriſhment from the weaker branches, which, when the ſtrong ones are taken off, will be too weak to bear fruit, and hereby the ſtrength of the trees is exhauſted to nouriſh the uſeleſs branches, which are annually cut off again, and thus are too many trees managed; and at the ſame time complaints made of their luxuriancy, becauſe two or three ſhoots, by drawing in the greateſt ſhare of the nouriſhment, grow

very ſtrong and woody, (whereas, if the nouriſhment had been equally diſtributed to a regular quantity of branches, there would be no ſign of their too great ſtrength), until, by often cutting off theſe vigorous branches, the trees are either entirely deſtroyed, or, at leaſt, rendered ſo weak, as not to be able to produce fruit; for although, by thus weakening the branches, it is often the means to produce a good number of bloſſoms, (as may many times be obſerved alſo upon autumnal ſhoots), yet the utmoſt of their ſtrength is ſpent in expanding their flowers, ſo that they rarely produce fruit, and very often the greater part of the branches die ſoon after, which is ſuppoſed to be occaſioned by a blight, (as I have elſewhere ſaid,) when, in reality, it is nothing leſs than the fault of thoſe who have the management of the trees. It is, therefore, of the greateſt conſequence to wall-trees, eſpecially

of theſe ſorts, to go over them in the month of May, to rub off all irregular ſhoots, and to train in the branches that are left, in due order, to the wall, that each ſhoot may have its due advantage of ſun and air, both of which are abſolutely neceſſary to ripen and prepare the wood for the next year's bearing; and, by duly obſerving the trees, at this ſeaſon, there will not be occaſion for ſo much cutting as is often practiſed on peach trees, to their great injury; for their wood branches are generally ſoft, tender, and pithy, which, when greatly wounded, are not healed over again ſo ſoon as many other ſorts of trees; and the wet, inſinuating into the wounded parts, doth often cauſe the branches to canker and die, which may be entirely avoided by the gentle method of pinching and rubbing off the buds, in the ſpring ſeaſon, which never makes any wounds on the tree; and hereby a vaſt deal of labour is ſaved; for one

perſon, who is ready at this buſineſs, will go over a great quantity of walling in a day; whereas, if the trees are permitted to grow rude all the ſpring, they will require ſix times the labour to reduce them into order; beſides, it is a great diſadvantage to the fruit, in permitting the branches of the trees to extend from the wall and ſhade them, and when they have grown under the ſhelter of theſe branches and leaves all the ſpring, until midſummer, then, by pruning off ſome of theſe ſhoots, and nailing the others cloſe to the wall, the fruits are ſuddenly expoſed to the ſun and air, whereby they receive a great check, and are not only retarded in their growth, but often rendered ill taſted, and have rough ſkins. The diſtance which the branches of theſe trees ſhould be allowed againſt the wall, muſt be proportioned to the ſize of the fruit, or the length of the leaves; for, if we obſerve how the branches

of trees are naturally diſpoſed to grow, we ſhall always find them placed at a greater or leſs diſtance, as their leaves are larger or ſmaller; and there is no ſurer guide to a curious artiſt than Nature, from whence a gardener ſhould always be directed, in every part of his profeſſion, ſince his buſineſs is to aid and aſſiſt Nature, where ſhe is not capable of bringing her productions to maturity, or where there is room to make conſiderable improvements by art, which cannot be otherwiſe effected, than by gently aſſiſting her in her own way.

"But to return to pruning theſe trees: the branches being carefully trained in, as before directed, in the ſpring and ſummer ſeaſon, we come now to treat of the winter pruning, which is commonly performed in February or March; but the beſt ſeaſon for this work is about Michaelmas, when their leaves begin to fall, which will be early enough for their wounds

to heal before the froſt comes on; ſo that there will be no danger of their being hurt thereby: and the branches of the trees being proportioned to the ſtrength of their roots at that ſeaſon, all the aſcending ſap in the ſpring will be employed to nouriſh only thoſe uſeful parts of the branches which are left; whereas, if they are left unpruned till February, the ſap in the branches being then in motion, as may be obſerved by the ſwelling of the buds, the greateſt part of it will be drawn up to the extreme parts of the branches, as muſt afterwards be cut off; and this may eaſily be known by obſerving the ſtrongeſt ſhoots at that ſeaſon, when you will find the extreme buds to ſwell faſter than moſt of the lower ones; for their being no leaves then upon the branches, to detain the ſap to nouriſh the lower buds, the upper ones will always draw from thoſe below.

"In pruning theſe trees you ſhould

always obſerve to cut behind a wood-bud, (which may eaſily be diſtinguiſhed from the bloſſom-buds, that are ſhorter, rounder, and more turgid than the wood-buds,) for if the ſhoot have not a leading bud where it is cut, it is very apt to die down to the next leading bud; ſo that what fruit may be produced above that will come to nothing, there being always a neceſſity of a leading bud to attract the nouriſhment; for it is not ſufficient that they have a leaf-bud, as ſome have imagined, ſince that will attract but a ſmall quantity of nouriſhment; the great uſe of leaves being to perſpire away ſuch crude juices as are unfit to enter the fruit. The length you ſhould have theſe branches ſhould be proportioned to the ſtrength of the tree, which, in a healthy, ſtrong one, may be left ten inches, or more; but in a weak one they ſhould not be more than ſix inches; however, in this you muſt be

guided by the poſition of a leading bud, for it is better to leave a ſhoot three or four inches longer, or to cut it two or three inches ſhorter, than we would chuſe to do, provided there be one of theſe buds; it being abſolutely neceſſary for the future welfare of the tree. You ſhould alſo cut out entirely all weak ſhoots, though they may have many bloſſom-buds upon them; for theſe have not ſtrength enough to nouriſh the fruit, ſo as to give it a kindly flavour, but they will weaken the tree.

" In nailing the ſhoots to the wall, you muſt be careful to place them at as equal diſtances as poſſible, that their leaves, when come out, may have room to grow, without ſhading the branches too much; and you ſhould never nail them upright, if it can be prevented; for, when they are thus trained, they are very ſubject to ſhoot from the uppermoſt eyes, and the lower part of the ſhoots will

thereby become naked." He further remarks: "When your fruit is ſet, and grown to the bigneſs of a ſmall nut, you ſhould go over the trees and thin them, leaving them at leaſt five or ſix inches aſunder; for when they are permitted to remain in bunches, as they are often produced, the nouriſhment, which ſhould be employed wholly to the fruits deſigned to ſtand, will be equally ſpent among the whole number, a great part of which muſt be afterwards pulled off; ſo that the ſooner it is done, the better it will be for the remaining fruit: and if, as it ſometimes happens, that a part of thoſe left by any accident ſhould be deſtroyed, yet the remaining ones will be much the larger, and the trees will gain more ſtrength; for a moderate quantity of fruit is always preferable to a great crop. The fruit, when but few, will be much the larger, better taſted, and the trees in a condition to bear

well the ſucceeding years; whereas, when they are overcharged with fruit, it is always ſmall, ill taſted, and the trees are generally ſo much weakened thereby, as not to be in a condition for bearing well for three or four years after: ſo that, upon the whole, it is much better to have a leſſer number of fruit than is commonly eſteemed a crop, than to have too many, ſince the fruit and the trees are benefitted thereby.

"The further management of peach trees, in ſummer, I have already mentioned, and ſhall only add a word or two more upon that head in this place:

"1ſt, That the ſhoots being regularly trained to the wall, as they are produced, the fruit will always be equally expoſed to the ſun and air, by which they will be kept in a conſtant and equal ſtate of growing; whereas, when they are overſhadowed by luxuriant branches for ſome time, and after-

wards expoſed to the ſun by cutting off thoſe branches, their ſkins will grow tough, and the fruit will be greatly retarded in its growth.

"2dly, By rubbing off and diſplacing irregular ſhoots, as they are produced, there will be no need to uſe a knife to thoſe trees in ſummer, which is often what they are greatly injured by; for when there are large wounds made on theſe trees, eſpecially in ſummer, it weakens them very much: beſides, as I have before ſaid, by doing this early, the ſap of the trees is not employed to nouriſh uſeleſs branches.

"3dly, I would adviſe never to ſhorten any of the branches in ſummer, unleſs it be to procure ſome ſide ſhoots, to fill up a vacancy of the wall; and this ſhould never be done after May, becauſe the ſhoots produced after that time are never duly ripened, and ſo are no better than autumnal branches.

"When theſe rules are duly executed, there will be no occaſion to cut off the leaves of the trees to admit the ſun to the fruit, which is too often practiſed; for if we conſider, that the leaves are abſolutely neceſſary to cheriſh the bloſſom-buds, which are always formed at the foot-ſtalks of the leaves; ſo, pulling them off before they have performed their office aſſigned them by nature, is doing great injury to the trees, therefore I caution every one againſt that practice."

My readers will excuſe ſo long a quotation, as it ſtruck me, the ſentiments of one ſo high in reputation, would have much greater weight than my own private opinion, unſupported by his authority. Theſe remarks will undoubtedly be needleſs to many already well-informed; however, to them they can do no harm, and to others may do ſome good, numbers of whom, within my

own knowledge, have many trees, and are but little aware of the management they require. Theſe I would adviſe to make themſelves maſters of the ſubject. I can aſſure them, from ſome experience, it will afford them much ſatisfaction. They will then be frequently viſiting their trees, and feel both an inclination and an intereſt in conſidering, frequently, what is moſt neceſſary to be done. Thoſe, more eſpecially, who do not keep a regular gardener, will, by degrees, acquire habits of attention, and, by doing little matters themſelves, may be of much uſe both to their own health and that of their trees. They will alſo be better qualified to appreciate the competency of the gardener to what he undertakes, and know whether he underſtands his buſineſs, and treats the trees with propriety. There are ſo many pretenders to the art of managing fruit-trees, that thoſe, who are but little

verſed in the matter, are liable to much impoſition from a ſet of men more conceited, perhaps, than any other, and who, as in moſt other caſes, affect the more the leſs they know. A great many others there alſo are, who, knowing better than they practiſe, ſerve more for the ſake, merely, of having always a place to go to, than they can ſerve well; and are wanted, perhaps, in ten places at the ſame time; ſo that ſome muſt ſuffer, and their trees be greatly neglected at the very ſeaſon they require moſt attention.

Shoots, in ſpring, ſhould be nailed in as ſoon as they have acquired ſufficient length, and, as Millar directs, "to rub off all foreright, and ſuch as are ill placed," and when they throw out long, vigorous, luxuriant ſhoots, the tops ſhould by no means be ſuffered to remain, but pinched off, as they muſt otherwiſe rob the other parts of the tree. By this ſeaſonable

check, the ſap will be immediately diffuſed, to the general ſupport of the whole; the latter as well as the earlier ſhoots. Theſe will, in conſequence, puſh out, and frequently produce good bearing wood, happily ripened or prepared for next year. But if due attention be not paid to this, theſe redundancies will require to be cut at the winter or autumn pruning, after having extremely impoveriſhed the tree during the whole time of its growth.

This I apprehend to be ſo abſolutely indiſpenſible, that I cannot help urging the moſt unremitting attention to the practice of it. Who can help regretting, on walking in the garden even of the greateſt ſtranger, to ſee his trees injudiciouſly treated, as they often are, and perhaps the owner put to as much expence in pruning, &c. &c. as he could have incurred from the beſt poſſible management?

Millar ſays, "The beſt earth for

peach trees is ſuch that is neither too ſtiff and moiſt, nor over dry, but of a middling nature; this ſhould be dug ten inches deep, taking the turf with it, and ſhould be laid in heaps eight or ten months before it is uſed, during which time it ſhould be often turned, to rot the turf and break the clods, whereby it will be rendered light and eaſy to work; and about the beginning of September you may carry it into the garden."

He might have recommended this for all kinds of fruit-trees. I know of none but what it would well agree with, but in many ſituations it is not to be obtained. It is very agreeable to plant a garden where the ſoil is favourable; but natural advantages of this ſort are not always to be found, even in ſituations otherwiſe agreeable. Gentlemen are often attached to particular ſpots, where the ſoil may be very unfriendly, and unleſs it be improved, and the quality conſiderably

changed, there is little probability his wall-trees, eſpecially peach and nectarine, will thrive.—Suppoſe it not naturally ſtiff and wet. In this caſe I would recommend the uſe of ſuch a compoſt as would bring it as near to a loam as poſſible. Nothing will effect this better than the ſcreenings of rubbiſh from old buildings, and the ſcrapings of turnpike-roads, mixed in due proportion with the natural ſoil, which ſhould be dug from the border where the trees are intended to be planted; not leſs than ſix or eight feet wide, and two feet or two feet ſix inches deep, with a pavement of broken brick, lime rubbiſh, or other hard materials, to prevent the trees from ſtriking down into the under ſtrata.

I believe alſo, a mixture of rotten tan would be found a good addition, for meliorating ſtiff ſoils. The ſcrapings of hard turnpike-roads, as recently obſerved, are certainly good;

beſides the manure they contain, which is finely pulverized by the friction of the wheels, the grit in it has a great tendency to divide, and render more free and porous, ſuch ſoils as are naturally too adheſive; and by this means the mixture will the more eaſily drain off.

A keen gravel is alſo a very unfriendly ſoil for theſe trees. I know nothing more likely to improve it than the ſcourings of ditches and the cleanſings of ponds, mixed with lime, marle, and a quantity of rotten cow-dung. It would be of great uſe, where clay could be obtained. A mixture of it might be very ſerviceable, but it ſhould lie long, and be often turned over, that it may be thoroughly incorporated; and where the ſoil happens to be of either extreme, reaſon points out that it wants the reverſe, to render it neareſt a loam.

But let the ſoil be what it may, I

would recommend it to be dug out of the border aſſigned for the trees, to the depth I have propoſed, and always to provide a pavement at the bottom, for preventing the roots from ſtriking down too deep, and getting beneath the warming influences of the ſun; which might occaſion them to grow too luxuriant, and prevent their bearing.

Where the ſoil is unfriendly, the walks alſo ſhould be dug out of the adjoining border, to the ſame depth, and filled up with the ſame compoſt, giving it time to ſettle before the gravel be put on. This, I am perſuaded, will greatly help the trees, and make them endure much longer, as their roots extend much farther than is generally imagined.

Too many, with a view to obtain an early crop of peas, ſow them in the borders. It is ſurely a bad plan for the trees. Nothing ſhould be planted there that grows high, or has

the leaſt tendency to rob the trees of the nouriſhment the ſoil ſhould afford them. I would particularly exclude the whole tribe of cauliflowers, brocoli, or cabbages: they draw powerfully, and muſt exceedingly impoveriſh the ſoil; more eſpecially, as their roots find their way to a conſiderable depth. I have traced plants, not arrived to cabbages, about two feet below the ſurface, through ſuch a hard rock of marle as no tool but a pick-axe was ſufficient to penetrate. Early radiſhes and lettuces may be raiſed without injury. I have alſo a plantation of ſtrawberries, which ſeems hitherto followed by no ill effects; and the waterings they frequently require in dry weather, I have thought of ſome ſervice to the trees.

In planting, I would have preſerved a diſtance of fifteen feet between each tree; and not, as is practiſed by many, a half ſtandard between them;

but to make uſe of the vacancy until the trees grow ſo as to meet. Vines may readily be raiſed from cuttings, which ſhould be planted in a ſloping direction, the uppermoſt eye nearly covered with the ſoil, and placed cloſe to the wall. To keep the earth moiſt, place a flower-pan, filled with water, and a piece of liſt in it, one end hanging over the ſide, which will cauſe continual dripping, and greatly promote the growth of the cutting. Could rooted plants, however, be obtained, growing in pots, raiſed on W. Speechly's plan, they would come into bearing a year or two ſooner.

If the cuttings puſh out more than one ſhoot, pinch the others off, and nail that one up, that it may not be roken down by the wind. As ſoon as it has caſt its leaves in autumn, cut it down, ſo as not to leave more than three eyes. It is a folly to force their growing too faſt, as, when the tops

overrun the roots, it inevitably prevents their bearing. I would caution every one againſt planting a rooted vine, except it has been raiſed in a pot, and can be planted without diſturbing the root. I once took ſome cuttings of one about to be planted, which even came into bearing before the rooted vine.

There are but three ſorts of vines which anſwer well out of doors, or in the open air; the black cluſter, the Burgundy or Millar's grape, and for white ones none, in my opinion, exceed the royal muſcadine. The *white ſweet water* ripens ſooner and earlier than theſe; but I am about to diſcard them, for two reaſons. They are much more tender than any I know, when in bloom; there are few ſeaſons they make perfect branches, and they have ſo thin a ſkin, that when nearly ripe they are apt to burſt with wet. The *black ſweet water* is a good grape, and early ripe, but

I find a poor bearer. The *common muſcadine* is much planted, bears plentifully, and often forms large, long branches, but does not ripen equal to the *royal muſcadine*. This laſt has alſo ſo thick a pulp, that, if gathered when full ripe, and hung on lines in a dry room, it may be kept ſome months, and will remain all the time plump and good; which, in my opinion, renders it a valuable ſort, and well worth propagating.

The *parſley leaf*, or *Canada grape*, I find a moſt excellent bearer, and forms noble bunches, but it requires a ſeaſon uncommonly warm to perfect them. For a particular deſcription, however, of vines and grapes, with the improved method of mixing and managing them, I have great pleaſure in referring my readers to W. Speechley's Treatiſe on Vines; being, I believe, the beſt ever publiſhed. If my plan be adopted, of placing vines between the trees, they will, in a good

year, furniſh the table plenteouſly with delicious fruit, for a long time after the peaches and nectarines are over.

Gentlemen, about to erect walls for fruit, had better build them with flues, even though they never ſhould be uſed. Theſe may be finiſhed at no great expence, and will give them an opportunity of ſaving their fruit in unfavourable ſeaſons, when their trees are in bloſſom, and inſuring, for a ſmall premium, what no money, on ſome occaſions, can purchaſe. There is, beſides, a real ſaving in the ſcheme, which at firſt ſight may ſeem ſtrange, at leaſt till explained.

Few would think of building a wall leſs than a brick and a half thick, which admits of flueing, and the ſaving will be in the extra number of bricks it would certainly require to make it ſolid. The workmen will build it, as I know it from experience, for the ſame price as though it were

ſolid, and plaiſter the inſide of the flues with pargeting mortar, which is a quantity of cow-dung tempered up with mortar, to render it tough and prevent its cracking. This ſhould by no means be omitted.

I have not hitherto made uſe of my flues, but had occaſion laſt ſeaſon to obſerve the utility of the plan, in a garden at a ſmall diſtance from my own, where a few night fires ſaved an excellent and plentiful crop on a nectarine and two peach trees, while very few eſcaped on other trees in the ſame garden. Theſe flues were alſo made uſe of two or three years ago, to forward the grapes, as, the ſeaſon being backward, there was hardly any probability of their ripening; but, by the aid of a little fire, they ſoon came to great perfection. The berries ſwelled ſo much larger than uſual, that there was a very conſiderable increaſe even in their weight.

It will now, doubtleſs, be acknowledged, I have conſiderably exceeded what my printed advertiſement promiſed. I was deſirous not to fall ſhort, or give any juſt occaſion to ſay I had not rendered enough for value received, as I had much rather the obligation lay with the public than with me. I hope, at leaſt, none will tax me with impoſition. It is not merely an hypotheſis, grounded on prejudice, or falſe or imperfect information; but experience, founded on well-eſtabliſhed facts. But the public have been ſo often deceived and abuſed by ſpecious pretences, that they are now become more jealous and faſtidious, which has narrowed ſo extremely my ſubſcription, that I do not expect, from my preſent apprehenſion, it will amount even to one-fourth of what it reaſonably promiſed. I am, notwithſtanding, juſt as much obliged and as thankful to thoſe who have done me the fa-

vour to ſubſcribe, as though they had been ten times as numerous as they are; and I have for that reaſon been the more deſirous to compenſate them for the confidence they have repoſed in me. I have therefore added, to what was ſpecified in my advertiſement, an infallible method of preſerving fruit from waſps, which will be found as new as it is valuable; and there cannot be a doubt but this plan, duly practiſed, will entirely prevent theſe noxious inſects from ſwarming in future, as they ſome years do. I may, as well as others, be partial, and too highly appreciate my own diſcoveries; but, conſidering the great and manifold advantages reſulting from them, not only in preſerving fruit, but in various other reſpects, which muſt have occurred to moſt readers in the peruſal of the foregoing pages, I hope I ſhall ſtand excuſed. However, this information alone deſerves ten

times more than the whole is likely to yield me.

The deſtruction of earwigs, ants, mice, &c. will likewiſe be found a uſeful addition. From ſome of the agents, employed in procuring ſubſcriptions, I am told, that many have acknowledged that the means to prevent blights were much wanting, but the fear of being deceived has deterred them from favouring me with their names. I blame them not, but acknowledge they have had too much reaſon, from innumerable deceptions daily practiſed on public credulity, to fear this might turn out as falſe and deluſive as others had done. There is another claſs, alſo, perhaps, not quite ſo honourable, who have held back from ſubſcribing, under the confidence they may yet obtain it by the liberality of their more generous neighbours, who are diſpoſed to encourage ſuch uſeful diſcoveries. The majority may never have heard

of or ſeen any of the advertiſements. From theſe, when my labours are better known, I ſtill hope for an addition to the ſmall number who have already ſubſcribed. But, to ſuch as flatter themſelves with the perſuaſion of receiving all the inſtructions it holds forth gratis, let me ſay they certainly do not by me as they would be done by; and I do preſume, none of my ſubſcribers will feel themſelves at liberty to communicate any part of my work to ſuch as have not thought proper to encourage it. I wiſh not to withhold it from the public at large, but ſurely there can be no reaſon for my not receiving, in the firſt place, a due conſideration for the time and pains the collection of theſe facts and obſervations have coſt me, in proportion, at leaſt, to the valuable ends they may be found to anſwer: of which, however, it muſt be confeſſed, I have, at preſent, no expectation.

It has been my endeavour, through-

out, to be ſufficiently explicit; but, if in any thing I have failed, and any of my ſubſcribers wiſh for further elucidation, and will do me the favour of writing to me, poſt paid, what further information is in my power is very much at their ſervice, and ſhall be freely communicated.

One diſeaſe, incident to trees and plants, has not been mentioned, and which my ſpecific will not prevent; I mean *mildew*. I had no idea, till laſt ſummer, that this alſo is animalculæ. I knew, from dear-bought experience, it was ſomething exceedingly prejudicial wherever it happened to abound; having a large plantation of thoſe kinds of roſes uſed in medicine, and part of them much injured by it. A ſuſpicion, however, occurred to me, that this miſchief might be effected by inſects. Not being poſſeſſed of glaſſes ſufficiently powerful to aſcertain the fact, I ſent ſome leaves, much covered with the

mildew, to a friend, in town, who, I knew, had a good microſcope, to ſee what he could find out. His reply was, that he could diſcover both inſects and maggots.

This diſeaſe ~~can certainly~~ be cured, and, as I preſume, moſt effectually, by a ſummer's dreſſing. Nor does any thing occur to be ſo likely to prove efficient as a decoction of tobacco. This I mention, as I have ſeen peach trees infeſted with it; but it abounds moſt at the latter end of the ſeaſon. Many late crops of peas are ruined by it. Some years we hear great complaints of its attacking the wheat, and likewiſe the hops. Where they hide in winter ſeems unaccountable; but, minute as they are, I think they muſt be furniſhed with wings, for conveying themſelves to diſtant places, and to ſuch plants as ſuit them beſt, where they increaſe wonderfully. Late crops of peas are not ſo ſubject to mildew, when

ſown on freſh land, or land not cropped with peas before. This is not always practicable; but I throw out the hint, that ſuch, as have the opportunity, may avail themſelves of it.

I cannot conclude, without once more reverting to apple trees. Though it may appear a work off too great magnitude to dreſs the trees of a whole orchard, it would, in my opinion, perfectly repay the expence and trouble. One man would dreſs a great quantity in a day. Let all who have orchards, only conſider the difference between a good crop and a bad one, or none at all.

I have often regretted in obſerving how much orchards are in general neglected, particularly in this part of the country; how much they are overgrown with moſs, and encumbered with a great deal of ſuperfluous wood. I would therefore recommend to the attentive peruſal of gentlemen, an ingenious publication, the

Orchardiſt, by Thomas Skip Bucknall, Eſq. M. P. It contains much uſeful information, which, if duly practiſed in our orchards, would, in a few years, give them a more reſpectable appearance, and return the owners much more amply than they do at preſent. I remain, with due reſpect,

My Subſcribers

Much obliged Friend,

RICHARD BURLINGHAM.

Rose Hill, near Worcester,
2d Month 9th, 1802.

Printed by Darton and Harvey, Gracechurch-ſtreet, London.

ERRATA.

Page 4 line 10 *for* each *read* eaſily
24 — 17 *for* moſt *read* firſt
25 — 1 *dele* or hoped at leaſt
34 — 9 *for* walks *read* their runs
65 — 3 *dele* not
66 — 7 *for* the mixture *read* wet or water
70 — 10 *for* three *read* few
— — 21 *for* branches *read* bunches
72 — 9 *for* no great *read* leſs.

AN

APPENDIX

TO THE

TREATISE ON BLIGHTS,

OR

THE GREEN INSECT,

CALLED

THE APHIS;

WITH THE MEANS TO PREVENT IT:

ALSO

A METHOD TO PREVENT OR STOP THE PROGRESS OF THE MILDEW AND RED SPIDER:

WITH

SOME REMARKS ON THE CAUSES OF THE CANKER ON APPLE TREES,

AND THE MEANS TO RECOVER THEM:

AND

AN IMPROVED METHOD PROPOSED TO RAISE PINES, MELONS, AND CUCUMBERS, &c. WITHOUT DUNG, TAN, OR STEAM.

By RICHARD BURLINGHAM.

London:

PRINTED BY DARTON AND HARVEY, GRACECHURCH-STREET.

1803.

APPENDIX.

I THINK it a debt, due to my friends who ſubſcribed to the "Treatiſe on Blights," to communicate to them ſuch additional obſervations as I have been enabled to make during the laſt ſeaſon, ſo remarkable for blight; wherein the green inſect, or Aphis, has abounded more than uſual, and but few kinds of fruit-trees have eſcaped them. This, I conclude, was promoted, in a great meaſure, by the cold weather in the ſpring checking the due circulation of the ſap, which is ſuppoſed greatly to encourage their increaſe. Theſe inſects are ſuch enemies to trees and fruit, and ſo deſtructive of them, that I am induced to give ſome extracts on the ſubject, from a publication by the late Dr. Darwin, which I had not ſeen till within theſe few months paſt. He ſays—

"The hiſtory of the Aphis, Puceron, or Vine Fretter, is ſo curious; the deſtruction it commits on the foliage of the peach and nectarine is, in dry ſummers, ſo irreſiſtible; and its exiſtence on the trees ſo extenſive, that it demands our particular attention. From the obſervations of Swammerdam, Bennet, Dr. Richardſon, and of other philoſophers, this extraordinary inſect riſes in the ſpring from eggs, which are ſaid to be attached, by the parent Aphis, to the twigs of trees in the autumn, and are believed not a larva, or caterpillar, but a progeny ſimilar to the parent; every one of which produces, in about ten days, not an egg but another living progeny, to the ninth generation, without being connected amatorially with each other. The ninth generation produces males and females; ſome of both kinds with wings, and others without them; and this tenth generation from thoſe which were hatched from eggs become amatorially connected, and produce eggs, which are laid on the new twigs of various trees, for the next year's progeny, to be hatched by the vernal ſun. *Philoſ. Tranſ.* vol. lxi. page 182.

"In this uncommon circumſtance the eggs of the Aphis reſemble the ſeeds of plants, which firſt produce ſome ſucceſſive generations of leaf-buds, which are of a viviparous progeny, as mentioned in Sect. ix. 3, 1, of this work.

"Nor is this to be aſcribed to what has been termed equivocal generation, or to an impregnation of nine fœtuſes incloſed within each other, as ſome have ſuppoſed. But this central production of a viviparous progeny of the Aphis ſeems to reſemble the lateral production of a viviparous progeny from the polypus, which, in time, detach themſelves from their parents; ſo that theſe Aphiſes are not, I ſuppoſe, to be eſteemed fecundated females, but proliferous males, as explained in ZOONOMIA, Vol. i. Sect. 39, *on Generation*.

"This double mode of reproduction, ſo exactly reſembling the buds and ſeeds of trees, accounts for the wonderful increaſe of this inſect, which, according to Dr. Richardſon, conſiſts of ten generations, and of 50 at an average in each generation; ſo that the ſum of 50 multiplied by 50, and that product by 50 nine times, would give the product from one egg only in countleſs millions; to which muſt be added the innumerable eggs laid by the tenth generation, for the renovation of their progeny in the enſuing ſpring.

"Their punctures of the leaves of divers fruit-trees, in the ſummer, produce a ſwelling and elevation of the cuticle of the leaf, on its upper ſide, and a conſequent curling of it with its upper ſurface outwards, which terminates in a deſtruction of it, to the great injury of the tree, and frequently to the death of it. From Dr. Richardſon's account, the Aphiſes on the roſe-tree appeared in February, when the weather happened to be warm, from ſmall, black, oval eggs, which were depoſited on the laſt year's ſhoots in autumn, and that when the weather became colder great numbers of them periſhed; by which circumſtance the roſe-trees are, in ſome years, almoſt freed from them.

"They came to their full growth before April, and, after having twice caſt off their exuvia, every one of them produced about 50 young ones, all of which came into the world backwards, and adhered ſome time to the vent of their parent, by their mouths or fore-part,

as ſhewn, in a magnified ſtate, at Fig. 2, plate 9, and were at length ſet down on tender ſhoots of the plants, and came to maturity in about ten days, caſting off their coats two, three, or four times. The ninth generation, in October, conſiſted of males as well as females, which were ſeen to cohabit; and the eggs produced from their intercourſe, he aſſerts, were depoſited, generally, near the new buds, or on other parts of the trees which they poſſeſſed. Theſe were at firſt green, but in a few days became brown, and, by degrees, quite black. They were of a regular oval figure, about a tenth of an inch in length, and about half as broad; and adhered firmly, by means of ſomething glutinous, and reſiſted the ſeverity of the weather.

"Perhaps thoſe Aphiſes which were from eggs might eat ſome part of the peach leaves, during their larva ſtate, if ſuch exiſts, and occaſion them to curl up; while thoſe which were a viviparous progeny might only pierce the ſap-veſſels or blood-veſſels, and thus not apparently injure the leaves; as on nut-trees, where, perhaps, they were not hatched from eggs, but might have come thither in their winged ſtate, and have then produced their innumerable viviparous offſpring.—But how can vegetables protect the whole inferior ſurfaces of their leaves, and of their riſing ſtems, from the innumerable progeny of the deſtructive Aphis, which penetrates their chyle veſſels and their arteries; and which, from their immenſe numbers, may, in proceſs of time, deſtroy the vegetable world. Many vegetables have not yet acquired any means of defence, and have therefore the firſt growth of their foliage much injured, or totally deſtroyed, by this deſtructive inſect—as the nectarine, and peach, and plum, and cherry trees, in many parts of this country, as is every year ſeen and lamented.

"Some vegetables have, nevertheleſs, acquired an armour, which leſſens, though it does not totally prevent, the injuries of this animal. This is moſt conſpicuous on the ſtems and floral leaves of moſs roſes, and on the young ſhoots and leaf-ſtalks of nut trees. Both theſe are covered with thick-ſet briſtles, which terminate in globular heads, and not only prevent the Aphiſes from piercing their veſſels ſo eaſily, but alſo

ſecrete from the gland, with which I ſuſpect them to be terminated, a juice which is inconvenient or deleterious to the inſect which touches it.

"The means of deſtroying an inſect ſo extenſively injurious, not only to gardens and hot-houſes, but to half the vegetable world, would, indeed, be a valuable diſcovery. If the eggs exiſt on the young buds, as Dr. Richardſon affirms, ſome application to theſe, before hatched, might diſſolve their ſhells; as by very dilute marine acid injected on them, or by ſome adhefive material, which might inviſcate them as ſoon as they are hatched; whether they appear firſt in their larva ſtate, like minute caterpillars, or in the form of the parent Aphis: as ſoap-ſuds injected on the twigs before the leaves begin to unfold, or, perhaps, by rubbing them with oil or glue, by means of a ſponge or a painter's bruſh; but experiment alone can determine the effects of theſe applications, both on the inſect and on the tree. The moſt ingenious manner of deſtroying the Aphis would be effected by the propagation of its greateſt enemy, the larva of the aphidivorous fly, of which I have given a print, and which is ſaid, by Raumur, to depoſit its eggs where the Aphis abounds; and that, as ſoon as the larva are produced, they devour hundreds around them, with the neceſſity of no other movements but by turning to the right or left, arreſting the Aphis, and ſucking its juices. If theſe eggs could be collected, and carefully preſerved during the winter, and properly diſpoſed on nectarine and peach trees, in the early ſpring; or protected from injury in hot-houſes, it is probable that this plague of the Aphis might be counteracted by the natural means of devouring one inſect by another; as the ſerpent of Moſes devoured thoſe of the magicians.

"Mr. Harrocks, of Derby, ſhewed me this larva of the aphidivorous fly, which I ſaw devour two or three Aphiſes; and Mr. Swanwick, of this town, at my requeſt made an accurate drawing of both the larva and fly.

"A few years ago I obſerved that the bloſſoms of a quince tree, before they were quite expanded, were perforated by a fly; as the wound could be eaſily diſcerned, like that on young nuts, when wounded by

the curculio, and all the bloſſoms of a large tree were deſtroyed by a ſmall caterpillar; and in this late ſummer of 1799, the apple bloſſoms in this country are much injured by a caterpillar, which eats the ſeed in the pericarp of each bloſſom, either before or at the time of its impregnation; the petals of the flower cloſing again over it and dying. The leaves of many trees are renewed after being totally deſtroyed in the early part of the ſeaſon; but, though the leaves are reſtored after the depredation of this inſect, yet there follows an irremediable injury to the fruit."

The Doctor, after mentioning a variety of experiments, which he had directed to be applied to his trees early in the ſpring, and which were thrice repeated, acknowledges, to his great diſappointment, when the leaves appeared, they became affected with the Aphis as in former years.

What he relates reſpecting the larva of the aphidivorous fly, I had an opportunity of obſerving this ſummer: the gardener was nailing ſome cherry trees, and remarked a number of theſe grubs; on ſhewing them to me, I concluded that they anſwered the deſcription the Doctor had given of them, and applying one of them to a leaf where the Aphiſes abounded, could diſtinctly obſerve it ſeizing them, and apparently ſucking their juices, as the Doctor had deſcribed. Perhaps my readers may ſmile at his recommending the eggs to be ſought after, and preſerved to the next ſeaſon, for the purpoſe of placing them to be hatched on ſuch trees as are infeſted with the Aphiſes. He has given us no directions where to find their eggs, or how to diſcover them from thoſe of other inſects; and, were it poſſible, I do not think it probable, they would be able to deſtroy one in a thouſand; but the Doctor ſeems fond of theory.

The manner of the Aphiſes breeding I had obſerved before I ſaw his publication. Viewing them through a glaſs on a leaf where there were great numbers, and of different ſizes, I could clearly and diſtinctly ſee the young before they were diſengaged from the parent inſect, and juſt as the Doctor has deſcribed. I confeſs, until then I had entertained the idea they had been

produced from eggs, from which, undoubtedly, the firſt progeny are.

It affords me ſatisfaction, that I can, from the experience of another year, again recommend the winter dreſſing, and be able to point out ſome further improvements to what I had before adviſed; and here I am free to acknowledge that I was under a miſtake, in concluding it would be time enough to dreſs the trees when the bloſſoms were nearly ready to open; I am now convinced it ſhould be applied at an earlier period; and the firſt time mine was done, was much ſooner than in the laſt year, and I found it more effectual; for, after the buds are increaſed in ſize, the interſtice between them may afford an aſylum for the eggs, and alſo when the buds are grown large, there is a danger of rubbing them off, which may prevent the dreſſing from being properly and effectually applied. I am alſo convinced, it will be found more certain, not only to dreſs the trees, but to cover the whole of the wall. The firſt time that my trees were dreſſed, the wall was done alſo, and I think it next to impoſſible, to dreſs the trees perfectly without covering the wall; for, in endeavouring to avoid colouring the wall, many parts of the trees will eſcape the dreſſing. I ſhould have recommended this in the Treatiſe, but was apprehenſive it would have been objected to, as many would diſlike the appearance; but, to obviate this, I ſhall adviſe the addition of a little yellow ochre to the lime, which will give it the appearance of a ſtone, and have a neat lively effect; and in the ſummer, when the trees have obtained their verdure, the contraſt will be very agreeable. This work will be beſt and moſt expeditiouſly done by a common whitewaſher, with one of their large bruſhes; a quick workman would be able to go over a great deal of walling in a day, and let me again recommend to uſe none but good unſlacked lime, and to mix up no more than will be uſed in the courſe of the day. I am the more particular to revive this, having received a letter lately from a gardener to one of the firſt noblemen in Britain, who, after paſſing high encomiums on the Treatiſe, ſays, "I waſhed all my trees with your mixture; thoſe I did

as ſoon as the lime and water were mixed, killed all the bug or turtle inſects, but after it had ſtood twenty-four hours it did not kill them; from whence conclude our lime is not ſo ſtrong as yours." He adds, "I was rather ſorry I had not an opportunity to try your mixture to kill waſps, as there was not twenty to be ſeen during the ſummer months; in the month of May there was the greateſt number of breeders that was ever known, but the great rains, and cold ſummer, deſtroyed all their neſts. If your mixture will kill them, that alone is worth more than the coſt of your book, as they are the greateſt enemies we have in the fruit ſeaſon."

When the trees are pruned, I would adviſe to take off every ſhred; ſuch as will do again emerge in boiling water, to deſtroy any eggs or inſects that may be lodged in them. As ſoon as poſſible after the trees are finiſhed apply the dreſſing, and by no means defer it longer than the firſt month, as the buds begin to ſwell ſoon after that time, if the weather proves mild and open. From the experiments I have made, I do not find but water will do equally with chamber-ley, if the lime is ſtrong and good, of the conſiſtence of white-waſh; and the trees ſhould be carefully examined afterwards, and if any parts are omitted, or not perfectly covered, they ſhould be mended; and I think it would be a ſurer way, if any appears waſhed off by haſty rains before the trees come out, to do it again where wanting.

The effects of the blight this ſummer have been much more injurious to my trees, where the dreſſing was not applied, than in any former year ſince they have been planted; it not only took off the fruit, but killed a great deal of the wood. With a view to try the dreſſing fairly again, I had the reverſe ſide of each tree done to what was waſhed before, and had, in conſequence of the dreſſing, about forty or fifty dozen more nectarines and peaches than on thoſe other parts of the trees where it was omitted; on one nectarine in in particular I counted 188 on the ſide where the mixture was applied, and only five on the other; which was ſo grievouſly blighted as to kill a great part of that ſide of the tree.

The dreſſing, from the obſervation I have made, appears to have a ſalutary effect on diſeaſed trees. I have

an apple tree, which I raiſed from the kernel of an American pippin, which grew kindly, and bore fruit in the garden where it was firſt planted; but, on removing it to its preſent ſituation, it became very ſickly, the branches cankering and dying every ſeaſon for eight years paſt; but, by taking pains to clear it from the moſs, paring out the cankers, and afterwards dreſſing it with the mixture, it has made the kindeſt ſhoots this ſummer it ever has done ſince growing in its preſent ſituation, and I think bids fair to make a healthy thriving tree.

I would again ſtrenuouſly recommend to diveſt all fruit trees of moſs, as it is a much greater harbour to inſects than is generally ſuppoſed; and when once they are well cleared, I believe there is little doubt but the mixture will keep them ſo. I not only applied the mixture to my peach and nectarine, but alſo to the apple trees, and I think they were the freeſt from the caterpillar, and bloomed the fineſt they have ever done, and there was an appearance of the beſt crop of fruit, until the ſharp froſt took moſt of them off; ſo that I am fully of opinion it would well repay the coſt and trouble to do whole orchards with it.

The canker on apple, and ſome other fruit trees, I am fully convinced, is wholly the work of inſects. The parent, I conclude, depoſits the eggs on the trunk or branches, and when hatched, the young caterpillar perforates the bark, and after it has got entrance, it affords it food and ſhelter. This autumn, in paring out ſome cankers not larger than a ſixpence, I found ſeveral ſmall grubs, of a reddiſh colour; and in others, which were larger, both eggs and inſects; and while they remain there, the canker is continually increaſing. The old varieties ſeem the moſt ſubject to it, the golden pippin and nonpareil in particular; alſo the autumn burgamot pear. Theſe ſeem much worn out with age; and it has long been obſerved, that inſects are the moſt diſpoſed to attack thoſe trees that are the leaſt thriving; in ſuch ſoils where they grow vigorous they are the freeſt from it. The under ſtrata of my garden is a hard rocky marle, and I apprehend few ſoils more unfriendly to apple trees, and in ſuch I have remarked they are the moſt ſubject to the canker; but, by taking

due care to pare it out and dreſſing them, I have very much recovered my trees. I had recommended to apply boiled linſeed oil to the part, but, from the obſervations I have made this ſeaſon, I have reaſon to think it obſtructs the growth of the young bark, which has induced me to apply a mixture of lime and cow dung, of the conſiſtence of mortar, which I find effectually preſerves it from the weather; and where the under ſtrata is ſuppoſed to be unkind to trees, I believe it will be found of ſervice to open the ground to the roots, and cut off ſuch as appear to ſhoot downright; if the trees have a large top, it may be neceſſary to leſſen it, leſt they ſhould be ſo weakened at the root as to be blown down by high winds.

I have now given ſuch further information as I thought neceſſary reſpecting the winter dreſſing, which I believe will be found certain to deſtroy either eggs or inſects that remain on the trees through the winter; but I do not pretend it a ſpecific, to cure or prevent every diſeaſe trees are ſubject to. I know it will not, alone, keep off either the mildew or red ſpider; but the latter is harmleſs out of doors, compared to either the Aphis or mildew. Several of my peach trees have been infeſted with the latter for two or three ſeaſons paſt, and what is ſingular, though my wall is planted alternately with a peach and nectarine, not one of the latter, that I have obſerved, is in the leaſt affected with it; but I believe it is natural to my ſoil. Late crops of peas are generally deſtroyed by the mildew. I have a large plantation of roſes, one part of them has been ſo injured by it, that the bloſſoms have ſcarcely been worth picking. The ſpring before the laſt I had a quantity of lime dug in among them, and this ſummer they have been the cleareſt from the mildew, and bloomed finer than in any former year. I have the greateſt reaſon to attribute the improvement to the lime, which has induced me this autumn to put about one buſhel and a half, or rather more, to each peach tree infeſted with the mildew: I have had it turned in a good depth, the whole breadth of the border, and as wide as the trees extend againſt the wall; concluding their roots ſpread as far beneath the ſurface I would with thoſe, whoſe trees are infeſted in like manner, to try the ſame,

I think I may ſafely engage it will not injure them, and there is a great probability it will be of ſervice.

The great number of waſps in this part of the country in the autumn, afforded me an opportunity of fully proving the efficacy of the mixture I had recommended to deſtroy them, which I found to anſwer the purpoſe fully: in about two weeks from the time I laid the mixture, few were to be ſeen about my premiſes, although they abounded before; and, from the quantity that they eat, an innumerable number muſt have been killed. I had repeated opportunities to try it with thoſe which flew into the houſe; ſuch as ate freely, were very ſoon unable to fly, and dropped down motionleſs in about half an hour; others that had eaten leſs ſurvived longer, but it was certainly ſure to kill them. In addition to the tubes directed to be uſed in the Treatiſe, I placed a number of oyſter ſhells upon the top of the wall, and put in each about half a tea-ſpoonful of the liquor, ſufficient to deſtroy a conſiderable number of waſps and flies, which I had occaſion to repeat daily; this plan anſwered well, as the weather proved dry. My reaſon for not putting more at a time, was, leſt haſty rains ſhould waſh it away. Some few fed ſo greedily that they died upon the wall, but moſt of them flew off with it, I conclude, to feed their young, and I cannot believe one of them made a ſecond viſit; which I do not doubt, in a general way, they repeat ſeveral times in a day, and, I have reaſon to think, to the ſame fruit they had fed upon before. Their ſagacity to return where they have met with agreeable food, I believe, may eaſily be proved by a little attention: put a quantity of honey in a convenient place, and with a camel hair pencil colour them with ſome vermilion, and repeat this as often as any are feeding; by watching it two or three times a day, I am of the opinion that ſome would be ſeen there again.

I find a quarter of an ounce of arſeniat of pot-aſh ſufficient to ſix ounces of water, and mixed with equal parts of honey.---I put no more honey to the ſolution than I expect will be uſed in a day or two, as I thought it did not keep well if mixed in too large a quantity. It requires ſome attention, but is not attended with much trouble or loſs of time.

I think alſo, it will be found uſeful to deſtroy wood-lice, which in ſome places much abound, and are deſtructive to fruit, beginning with them when quite ſmall; I have not proved it, but it ſeems probable they will feed upon it. I throw out the hint for others to try the experiment.

The duke of Devonſhire's gardener, at Chatworth, Derbyſhire, has communicated to me the method he has adopted to prevent the mildew and red ſpider, on his peach and nectarine trees in the glaſs caſes, which I doubt not will equally anſwer to trees in the open air. He ſays, "I entirely prevented the mildew and red ſpider laſt ſummer, by your mixture and the following: two ounces of ſoft ſoap, one ounce of flower of ſulphur, and one ounce of common turpentine, to one gallon of boiling (ſoft) water; it may be put on with flannel gloves, or a ſmall engine, to be applied as ſoon as the trees begin to fruit, and repeat it two or three times during the early part of the ſummer; not one of them (viz. the peach or nectarine trees) had the leaſt appearance of either mildew or the red ſpider during the ſummer; and their wood is well ripened, the bloſſoms bud bold, and very promiſing for a crop the next ſeaſon. I have lived here upwards of forty-three years, and never could ſtop the mildew before, though I have very much checked it by the application of ſulphur, as deſcribed in my former letter to you. How far it may anſwer in the open air I cannot ſay, but I think it likely, as the ſoap and turpentine adheres to the wood and leaves. I think the mixture ſhould be put on with flannel gloves, and repeated ſeveral times after the trees begin to puſh, for ſix or eight weeks."

I have alſo been aſſured, by another gardener, that the ants may be either deſtroyed, or effectually driven away, by watering their runs with chamber-ley. As they are ſuch enemies to fruit, I think they may be prevented by watering the earth cloſe to the walls, and round the but of each ſtandard tree; which, if it does not deſtroy them, according to his teſtimony, it will drive them away; and I am certain it will prove of ſervice to the trees rather than an injury, if not put on in too great quantities at a time.

A gentleman of Worceſter has improved a method

(recommended about two years ſince in the Repertory of Arts) for raiſing melons and cucumbers by means of heated water. This plan having ſucceeded ſo well the two laſt ſeaſons, I will endeavour (having his permiſſion) to deſcribe it. The firſt trial was made with a melon pit, ten feet long by five wide: a fire place was erected at one end of the frame, over the grate of which was placed a copper boiler, containing about two gallons; this boiler had a copper pipe brazed or rivetted to its top, and from thence a leaden pipe, three inches in the bore, was ſoldered; this pipe, after paſſing through the frame into the pit one foot, branched off each way, kept at an equal diſtance from the ſides and middle of the pit; at the oppoſite end, the pipe was united again in one, at a foot diſtance from the other end of the frame, and from thence paſſing through the outſide, it communicated with the bottom of a ſmall ciſtern or reſervoir lined with lead, ten inches ſquare, and two feet and a half deep.

This ciſtern being expoſed on the outſide of the frame, it is neceſſary it ſhould be defended from the cold air, it muſt therefore be incloſed with wood, and have a cover made to fit it cloſe to keep in the heat, and that but little ſteam may eſcape. Inch deal is ſufficient.

The pipes are laid upon an inclined plane of three inches in ten feet, the higheſt part next the reſervoir, where the water is put in to fill the boiler, and ſufficient to leave about the depth of ſeven or eight inches of water in the reſervoir, which will not want repleniſhing oftener than once a week.

He recommends none but ſoft water to be uſed, and puts in a ſmall piece of ſoap, to prevent the boiler, &c. from furring; and once in about ſix weeks to draw off the water and fill it with freſh. He covers his pipes with earth to the depth of about nine to twelve inches; care ſhould be taken never to ſuffer the water to get ſo low in the reſervoir as to prevent the pipes from being full, and to keep no more fire than will preſerve the water a little below the boiling heat. This year he has had an additional pipe, three quarters of an inch bore, laid in from the lower part of the uppermoſt croſs pipe next the reſervoir, which is placed in the bed a little below the other pipes, and communicates at the

further end with the ſmall pipe at the bottom of the boiler, to which a cock is brazed, occaſionally to draw off the water. This ſmall pipe he thinks neceſſary to prevent the concuſſion there would otherwiſe be, from the ſteam meeting cold water, which would endanger the burſting of the pipes, and which has actually been the caſe in one inſtance for want of this precaution; as the heated water naturally aſcends, and the cold water finds its way down the ſmall lower pipe and enters at the bottom of the boiler. He calculates, that about ten pounds of coal is ſufficient to make the water of a proper heat, and when the weather is warm, it will continue ſo until the next evening; but in the firſt part of the ſeaſon it will be found needful to light the fire twice a day. This year he has added another pit on the other ſide, and finds one fire and boiler properly to heat both. He has a tin cup, about nine inches deep, nearly half filled with water, which he keeps in the pit, the upper part level with the ſurface, occaſionally to prove the warmth of the bed with a thermometer, which he endeavours to keep at about ninety degrees, judging that to be a proper temperature for melons, &c. and that he can better aſcertain it by that means than with watch ſticks; the hands, from the difference in the weather, and alſo by exerciſe, are rendered too uncertain to form a true idea by feeling the ſticks. I have, with his directions, made the like experiment in a ſmall grape houſe, and find it anſwers well; my pit is near ſeventeen feet in length, and five wide, and I find I can ſufficiently warm it with what I eſtimate at little or nothing, as it would be thrown away was it not uſed in this manner. The principal part of what I burn is that which has paſſed through the aſh grate, ſifted through a fine riddle, which I had with a view to render the aſhes the better manure; conceiving the cinders did more injury than ſervice to the land they were put on. Theſe cinders, although ſo ſmall, I ſometimes find too good when the wind is high, by burning outfaſter than neceſſary; to remedy which, I have had recourſe to aſhes unriddled to mix with them, and theſe I find ſometimes will run to cinders. I have adopted count Rumford's plan of a double door to the houſe, to keep off the external air from the fire, and a

circular draught plate underneath to regulate, or when neceſſary, to ſtop the draught, which I apprehend ſaves a great deal of fuel; for if the draught remains open after the fire is burnt clear, it will ſoon be conſumed, and when burnt out, cold inſtead of warm air will draw through the flues, and conſequently cool the houſe.—I would recommend the double doors and circular draught plate as the moſt economical to all ſtoves, whether in hot houſes, or under furnaces, as well as to caſt or wrought iron ovens. In hot houſes, where a conſiderable fire is kept up with a view to force fruit early, if this plan ſhould be adopted to warm the pit, inſtead of tan, to raiſe pines, melons, &c. it will be needful to build a ſtove on purpoſe for the boiler, which I think may communicate with the flues warmed by the larger fire, which, if applied to heat the water, would make it boil ſo faſt that it could not be kept within the reſervoir, (as I find the water will be of the ſame heat in the latter as in the boiler, although ſeventeen feet apart,) and would probably heat the earth beyond its due temperature, unleſs it can be ſo contrived (which I think it may) to heat the water only when neceſſary, by means of ſliding plates.

I believe this plan may be adopted with the greateſt certainty to raiſe pines, and the bed or pit kept up to any heat required, and in ſeveral reſpects will be found preferable to tan, which much encourages the breed of worms, &c. which on this plan would be entirely, or very much prevented; and the trouble and inconvenience of removing the bark bed done away. But where the pit is wide, it will be found neceſſary to have pipes in proportion; ſeven feet, I conclude, would require three; and nine or ten feet four pipes; but the ſame ſized boiler, I expect, would ſerve all.

I have now made ſuch further communications as I thought would prove uſeful, and, I truſt, intereſting to many if properly attended to; and I hope, will be thought fully to compenſate for any deficiency in the Treatiſe; and ſhall conclude with this caution or remark, that being in poſſeſſion of the beſt remedies will not avail, unleſs put in practice. I remain, with due reſpect,

Roſe Hill, near Worceſter, your obliged friend,
13th of 12th Month, 1802. RICHARD BURLINGHAM.

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